HW:

p. 408: 3

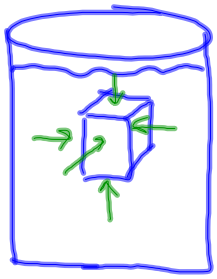
p. 409: 5, 7, 9

- Pressure:

$$P = \frac{F}{A}$$

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

- These are all scalars
  - Force we use is the perpendicular force



- Unit: Pascal

$$1\ Pa \equiv 1\ N/m^2$$

- force exerted by a fluid at rest acting on any rigid surface is always perpendicular to the surface
- this force is known as hydrostatic pressure
- Gravity is principle cause of hydrostatic pressure

- Short derivation

$$P = \frac{F}{A} \qquad F = mg$$

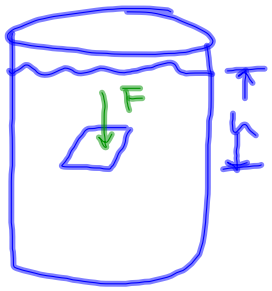
$$= \frac{mg}{A} \qquad \rho = \frac{m}{V}$$

$$m = \rho V$$

$$= \frac{\rho V g}{A} \qquad V = A h$$

$$= \frac{\rho A h g}{A}$$

$$= \rho h g$$



g = constant

ρ = constant

- Surface pressure → pressure on surface of liquid

- Total pressure on object:

$$P_{total} = \rho g h + P_s$$

Buoyancy Principle:

- an object immersed in a fluid will be lighter by an amount equal to the weight of the fluid it displaces

- Pressure difference betw. top and bottom of object

- This pressure difference leads to the buoyant force

- F_B = weight of fluid displaced

- Volume of object = volume of fluid displaced